TECHNICAL NOTES

LAKE STATES FOREST EXPERIMENT STATION
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Twelve-Year Results of a Mechanical Thinning in Over-Dense Jack Pine

Because of the large seed supply in its persistent, frequently serotinous cones, jack pine (Pinus banksiana Lamb.) often reproduces itself in very dense stands following fire. These stands may exceed 20,000 stems per acre under favorable seedbed conditions. Unless some form of artificial thinning is employed the stands often stagnate below merchantable size, developing spindly thin-crowned trees that are highly susceptible to ice and snow damage.

In 1945, tests seeking an economical method of thinning such stands were installed by the Mosinee Paper Mills Company in cooperation with the Lake States Forest Experiment Station.[1/]

The area involved was a 9-year-old natural jack pine stand near Solon Springs, Wis. Stand density ranged from 8,500 to 18,500 stems per acre. The trees averaged 8 feet tall and 0.6 inch in diameter (table 1 on back of sheet).

The equipment used was a heavy Athens disk 6 feet wide pulled by a crawler tractor; thus all disked strips were 6 feet wide. The treatments were: (1) disked strips alternating with 6-foot-wide strips of standing trees, (2) disked strips alternating with 3-foot-wide strips of standing trees, and (3) cross-disked strips leaving blocks of trees approximately 6 feet square. Time required for disking ranged from 0.9 to 2.0 hours per acre.

Remeasurement of the stand during 1956 after 12 growing seasons revealed the following: Stand density ranged from 7,487 trees per acre on the unthinned area to 3,187 on the area where 3-foot-wide strips were left. Average diameter at breast height (d.b.h.) of the largest 1,000 trees per acre was 2.6 inches for the unthinned area compared to 3.1 inches for those on the 3-foot strips. Thinning the area by means of alternate 6-foot strips showed little increase in growth; the trees averaged only 2.8 inches.

Heavy rabbit feeding on the unthinned stand resulted in considerable mortality. This partly obscured the effect of artificial thinning.

The 12-year results of this study indicate that thinning in alternate 6-foot strips had little influence on the growth of the remaining stand. However, when the thinning was more severe, leaving only 3-foot-wide strips, the remaining stand showed a definite growth response. In addition, these trees are more sturdy, and therefore less susceptible to snow and ice damage than those in the unthinned stand.

The main disadvantage of this method of thinning is the lack of selectivity. Many suppressed and intermediate crown class trees left standing on the edges of the strips do not benefit from the thinning to the same extent that dominants would. It does however, provide an economical method of thinning large densely stocked areas in a short period of time.

1/ Credit is due Frank N. Fixmer, Forest Manager of the Mosinee Paper Mills Company, for help in planning and carrying out the tests.

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Table 1.--Results of mechanical thinning in 9-year-old jack pine stand[1/]

Treatment	Area disked	Disking time per acre	Two years after treatment					Twelve years after treatment				
			Trees per acre			Av. size largest tree per plot		Trees per acre			Av. size largest tree per plot	
			Thrifty	Unthrifty	Total	D.b.h.	Height	Thrifty	Unthrifty	Total	D.b.h.	Height
	Percent	Hours	Number	Number	Number	Inches	Feet	Number	Number	Number	Inches	Feet
No disking	0	--	4,250	12,363	16,613	1.2	11.1	562	6,925	7,487	2.6	20.1
Alternate 6-foot strips left	44	0.9	2,671	9,785	12,456	1.0	10.1	1,325	4,387	5,712	2.8	19.1
3-foot strips left, 6-foot strips disked	53	1.4	1,640	3,413	5,053	1.2	10.4	550	2,637	3,187	3.1	20.9
Cross-disked to leave 6-foot squares	72	2.0	1,062	3,518	4,580	1.1	10.4	737	2,488	3,225	3.0	19.9

1/ To determine stand density and tree size, 80 milacre plots were established in each treated area.